

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 57309-5034WO	<b>FOR FURTHER ACTION</b> <small>see Form PCT/ISA/220 as well as, where applicable, item 5 below.</small>	
International application No. PCT/US04/06333	International filing date ( <i>day/month/year</i> ) 03 March 2004 (03.03.2004)	(Earliest) Priority Date ( <i>day/month/year</i> ) 03 March 2003 (03.03.2003)
Applicant MONTANA STATE UNIVERSITY-BOZEMAN		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.



It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the Report**

- a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.



The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☐ Certain claims were found unsearchable (See Box No. II)

3. ☐ Unity of invention is lacking (See Box No. III)

4. With regard to the **title**,



the text is approved as submitted by the applicant.



the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,



the text is approved as submitted by the applicant.



the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

- a. the figure of the **drawings** to be published with the abstract is Figure No. 7A



as suggested by the applicant.



as selected by this Authority, because the applicant failed to suggest a figure.



as selected by this Authority, because this figure better characterizes the invention.

- b. ☐ none of the figures is to be published with the abstract.

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International application No.

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## Box IV TEXT OF THE ABSTRACT (Continuation of Item 5 of the first sheet)

The technical features mentioned in the abstract do not include a reference sign between parentheses (PCT Rule 8.1(d)).

### NEW ABSTRACT

A confocal optical device ( 10 ) is described. The device includes a tri-axial scanning mirror ( 48a ) that can provide for three-dimensional scanning of objects. In particular, the scanning mirror ( 48a ) has a deformable reflective membrane ( 48h ) mounted on two annular gimbaled members ( 48c, 48d ) to provide for rotation about two orthogonal axes. The deformable membrane, which can be provided at other suitable locations in the device, is used to control the focusing spot of the light beam transmitted from the device to the object being scanned. Various methods relating to the confocal optical device are also described.

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International application No.

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## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G02B 26/00, 26/08, 5/08, 7/182

US CL : 359/291, 295, 298, 224, 231, 247, 846, 872, 578

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 359/291, 295, 298, 224, 231, 247, 846, 872, 578, 290, 230, 293, 214, 849, 823; 369/112.01, 112.29, 44.23; 310/36

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched  
NONE

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6,147,789 A (GELBART) 14 November 2000 (14.11.2000), column 1, line 16 to column 4, line 31.	1-6, 14-21, 27, 29, 40-43
A	US 6,025,953 A (BU et al) 15 February 2000 (15.02.2000), column 7, line 29 to column 12, line 24.	1-6, 14-21, 27, 29, 40-43, 45-49
A	US 6,462,858 A (MacDONALD et al) 08 October 2002 (08.10.2002), column 3, line 11 to column 7, line 16.	1-6, 14-21, 27, 29, 40-43, 50-52
A	US 6,341,039 A (FLANDERS et al) 22 January 2002 (22.01.2002), column 4, line 7 to column 11, line 15.	1-6, 14-21, 27, 29, 40-43, 45-49



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search

14 April 2005 (14.04.2005)

Date of mailing of the international search report

29 JUL 2005

Name and mailing address of the ISA/US

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Continuation of B. FIELDS SEARCHED Item 3:

WEST:(mirror\$1 or lens\$2) SAME (deform\$4 or tilt\$3) WITH (reflect\$3 or membrane\$1) SAME (focal or focus\$3) and (mirror\$1 or lens\$2) SAME (deform\$4 or tilt\$3) WITH (reflect\$3 or membrane\$1) SAME (actuat\$3 or motor\$1 or transduc\$3) and (mirror\$1 or lens\$2) SAME (deform\$4 or tilt\$3) WITH (reflect\$3 or membrane\$1) SAME (curv\$3 or curvature\$1 or curvilinear\$2) and (mirror\$1 or lens\$2) SAME (deform\$4 or tilt\$3) WITH (reflect\$3 or membrane\$1) SAME (fiber\$1 or hous\$3 or tube\$1 or chamber\$1 or enclosure\$1 or ferrule\$1) and (mirror\$1 or lens\$2) SAME (deform\$4 or tilt\$3) WITH (reflect\$3 or membrane\$1) SAME (translat\$3 or mov\$3 or displac\$3) SAME (lateral\$2 or axial\$2 or longitudinal\$2)